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6 SILICON STORAGE TECHNOLOGY, INC. No. C 10-1515 MHP
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Plaintiff,

9
10 v.
11 XICOR LLC

Defendant.

MEMORANDUM & ORDER**Re: Cross-Motions for Summary Judgment**

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15 Plaintiff Silicon Storage Technology, Inc. (“SST”) brought this action against defendant
16 Xicor LLC, seeking a declaration that claims 12 and 13 of U.S. Patent No. RE38,370 (“the ‘370
17 patent) are invalid and that it has not infringed Xicor’s patent. Xicor filed a counterclaim alleging
18 infringement of the ‘370 patent. Now before the court are the parties’ cross-motions for summary
19 judgment as to whether claims 12 and 13 of the ‘370 patent are invalid under the rule against
20 recapture. Having considered the parties’ arguments and submissions, and for the reasons set forth
21 below, the court enters the following order.

22
23 **BACKGROUND**

24 I. Technology Addressed by the Patent-in-Suit

25 The patent at issue relates to the “tunneling oxide layer” of a computer memory chip and a
26 method for forming that region. *See* Docket No. 50 (Evans Decl.) Exh. C (‘370 patent) at 1:12-16.
27 Electrically erasable read-only memory devices (“EEPROM”) contain “floating gates” which store
28 electric charge and indicate the presence or absence of such charge with a binary 1 or 0. *Id.* at 1:19-

1 22. The floating gate is electrically insulated from the other electrodes of the EEPROM device by
2 one or more layers of a “tunneling” oxide, which under certain conditions allow electrons to
3 “tunnel” through to the floating gate *Id.* at 1:25-31. The tunneling oxide can only conduct a limited
4 amount of charge before it breaks down. The life of a tunneling oxide can be further limited by the
5 presence of structural defects and by the high levels of stress that develop in the tunneling oxide
6 during the production of the tunneling layer. *Id.* at 1:31-53. The ‘370 patent attempts to increase the
7 reliable, useful life cycle of a EEPROM device by producing a tunneling oxide layer that lacks the
8 defects and high levels of stress present in the prior art. *Id.* at 2:15-31. The patent discloses a
9 method and means of depositing a tunneling oxide using a low pressure, low temperature chemical
10 vapor deposition (“LPCVD”) process. *Id.* at 1:59-62. The patent identifies tetraethylorthosilicate
11 (“TEOS”) as the preferred chemical for the LPCVD process. *Id.* at 1:63-64.

12 Independent claim 1 of the ‘370 patent recites, in pertinent part:

13 An improved tunneling region for use with an integrated circuit comprising:
14 a first layer of polysilicon;
15 a first electron tunneling layer of thermal oxide formed over said first layer of polysilicon;
16 a second electron tunneling layer of annealed deposited silicon dioxide formed over said first
17 tunneling layer having a thickness less than 2000 Angstroms thick, said silicon dioxide layer
being formed by low pressure chemical vapor deposition **comprising the use of**
tetraethylorthosilicate; and
18 a second layer of polysilicon formed over said layer of deposited silicon dioxide . . .

19
20 *Id.* at 5:4-22 (emphasis added). Independent claim 4 recites, in pertinent part:

21 A semiconductor device including means for electron tunneling, comprising:
22 a first conductive layer;
23 an annealed silicon dioxide tunneling layer having a thickness less than 2000 Angstroms
24 formed on top of said conductive layer, said silicon dioxide layer being formed by low
pressure chemical vapor deposition **comprising the use of tetraethylorthosilicate;**
25 a second conductive layer formed on top of said silicon dioxide layer . . .

26 *Id.* at 5:30-43. Claims 12 and 13 were added to the ‘370 patent in reissue. These claims are
27 identical to claims 1 and 4, respectively, except that claims 12 and 13 delete the language

1 “comprising the use of tetraethylorthosilicate” present in the earlier claims. *Id.* at 6:16-46. The
2 genesis and subsequent deletion of these TEOS limitations is the focus of this dispute.

3 **II. Prosecution History**

4 The ‘370 patent, issued at the very end of 2003, has its origins in a patent application filed in
5 the year 1988, and the relevant prosecution history, stretched out over four different related
6 applications, is voluminous. The following summarizes this history and sets forth in detail only
7 those aspects of the prosecution history that are directly relevant to resolving the parties’ summary
8 judgment motions.

9 **A. The Original Application**

10 Xicor’s predecessor-in-interest¹ filed patent application No. 07/195,766 (“the ‘766
11 application”) on May 17, 1988. The ‘766 application contained method claims 1-12 and an
12 apparatus claim 13. Each of the independent claims 1, 6, 7, 9, and 13 included the deposition of
13 silicon dioxide by LPCVD, but none of these claims were limited to the use of TEOS in that LPCVD
14 process. Evans Decl. Exh. E at INT0001015-17. In an office action dated January 19, 1989, the
15 examiner found that the ‘766 application claimed two distinct inventions and ordered the applicant
16 to restrict the application to either the method or the apparatus claims. *Id.* at 1043. The examiner
17 reasoned, *inter alia*, that the apparatus recited in claim 13 “could be made by processes materially
18 different than those” in claims 1-12 and accordingly unpatentability of the [apparatus] would not
19 necessarily imply unpatentability of the [processes].” *Id.* The applicant traversed the restriction
20 requirement but elected to proceed with the method claims 1-12 should the restriction become final.
21 *Id.* at 1047-51. The examiner made the restriction requirement final on August 2, 1989. *Id.* at 1053-
22 54.

23 **B. The ‘774 Patent Prosecution**

24 On June 26, 1990, the applicant filed a continuation application, No. 07/545,122 (“the ‘122
25 application”), which contained solely the method claims 1-12 of the ‘766 application. On October 9,
26 1990, Claims 1-3 and 9 were rejected, *inter alia*, as anticipated by the prior art “Peek” reference. *Id.*
27 at 1107. The examiner stated that “Peek discloses a method of fabricating an EEPROM in which the
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1 dielectric is obtained by LPCVD of TEOS at 730°C.” *Id.* Xicor responded by amending claim 1 to
2 add the limitation “comprising the use of a silicon and oxygen bearing vapor comprising [TEOS] at
3 a temperature between 450° and 1000°C” to the recited LPCVD process. *Id* at 1117. Xicor attached
4 to its response a supporting declaration from William H. Owen, the Vice President of Product
5 Planning and Intellectual Properties at Xicor, which explained why Peek did not anticipate claims 1-
6 3. *See id* at 1127-1135. Based on the Owen declaration, Xicor argued:

7 Peek never actually constructed an EEPROM using TEOS nor did he deposit any oxide
8 layers intended to be used as a tunneling oxide . . . Peek concluded that TEOS oxide were
9 inferior and suggested that HTO oxides were the best for an EEPROM, at least insofar as the
10 insulating properties are concerned. Applicant submits this reference clearly teaches away
from the present invention . . . [T]hose in the art believed TEOS oxides to be inappropriate
for use in an EEPROM, and that the discovery that sufficiently pure TEOS oxides could be
deposited was a surprising and unexpected result.

11 *Id* at 1120-21. Xicor made similar arguments regarding the Peek reference at several other points
12 during the prosecution of the ‘122 application. *See id.* at 1121, 1130, 1153, 1161.

13 On May 7, 1992, the examiner rejected claim 7 of the ‘122 application as obvious over the
14 prior art Paterson reference. According to the examiner, “Paterson discloses a method of fabricating
15 a memory device having a floating gate [] and a tunneling oxide []” and “that the tunneling oxide
16 layer can be either thermally grown or deposited by LPCVD.” *Id.* at 1164. The examiner stated,
17 however, that Xicor could avoid an obviousness rejection over Paterson if it added an express TEOS
18 limitation:

19 If claim 7 was amended to recite that the tunneling oxide layer was deposited by LPCVD
20 using TEOS, the claim would be allowable over Paterson, since neither Paterson nor any of
21 the other references of record disclose the use of a deposited TEOS oxide layer as a tunneling
oxide in a memory device.

22 *Id.* at 1165.² On June 26, 1990, Xicor accepted the examiner’s suggestion and amended claim 7
23 (redesignated as claim 6) by adding the limitation “comprising the use of [TEOS]” to the recited
24 LPCVD process. *Id.* at 1174, 1176 (“Claims 6, 7 and 9 have been amended to add the limitation that
25 the CVD process called for comprises the use of TEOS, as suggested by the Examiner.”). On
26 November 23, 1992, the examiner issued her notice of allowability, *id.* at 1179, and U.S. Patent No.
27 5,219,774 (the ‘774 patent) issued on June 15, 1993, *see* Evans Decl. Exh. F.

1 C. The '585 Patent Prosecution

2 After the method claims comprising the '774 patent were allowed, Xicor turned its attention
3 to prosecuting its apparatus claims. On May 18, 1993, Xicor filed divisional application No.
4 08/064,203 (the '203 application), in which it pursued the original product-by-process claim 13 of
5 the '766 application and added seven new apparatus claims, all also drafted in product-by-process
6 form. Evans Decl. Exh. G at INT0000730. Claim 13 initially was submitted in its original form,
7 thereby lacking a TEOS limitation, but each of the new claims did include a TEOS limitation. *See*
8 *id.* at 752-53. In submitting its divisional application, Xicor noted that "[n]ew Claims 14-20 are
9 apparatus claims that are similar to the allowed method claims of the parent application." *Id.* at 754.
10 The '203 application, however, was assigned to a different examiner in a different art unit than the
11 allowed method claims. *Compare* Evans Decl. Exh. E at INT0001179 *with* Exh. G at INT0000755.

12 On July 23, 1993, the examiner rejected claims 13 and 14 as obvious in view of two prior
13 U.S. patents, but this rejection apparently bore no relationship to the use of TEOS in the LPCVD
14 process. *Id.* at 756-57. Nevertheless, Xicor responded to the July 23 office action by making a
15 number of amendments to claims 13 and 14, including adding a TEOS limitation to claim 13. *Id.* at
16 775-76. In its accompanying remarks, Xicor attached copies of the same declarations of William H.
17 Owen that had been submitted in support of the '122 application and that according to Xicor "bear
18 on the patentability of the claims pending in this application." *Id.* at 782. Xicor accordingly
19 repeated its earlier argument that Peek "clearly teaches away from the present invention" and that
20 "[a]t the time the present invention was made, those skilled in the art generally held the view, similar
21 to Peek's conclusions, that TEOS oxide layers were inferior to layers deposited by other
22 techniques." *Id.* at 780-81.

23 On March 25, 1994, the examiner rejected claims 13 and 14 on the grounds that the prior art
24 disclosed the claimed structures and specifically noted that the process limitations in those claims
25 were insufficient to overcome the novelty and obviousness rejections. The examiner "reminded"
26 Xicor that "it is the patentability of the final product *per se* which must be determined in a 'product
27 by process' claim, and not the patentability of the process, and that, as here, an old or obvious

1 product produced by a new method is not patentable as a product . . .” *Id.* at 788 (citing *In re*
2 *Thorpe*, 777 F.2d 695 (Fed. Cir. 1985)). In response, Xicor stated that the apparatus claims were
3 presented in product-by-process form because “the present invention . . . is not capable of
4 independent definition in structural terms.” *Id.* at 794. In order to show that the prior art did not
5 “possess the characteristics and structure” of the present invention and that the claimed device “is
6 both novel and non-obvious over the prior art,” Xicor attached yet another declaration from William
7 H. Owen. *Id.* at 794-95. In that declaration, Owen repeatedly refers to the structural advantages of
8 the claimed TEOS deposited oxide layer. He states that the TEOS deposited layer lacks the
9 structural defects that are often created by the prior art tunneling oxide layers, that the TEOS
10 deposited layer induces a much lower magnitude of stress on a memory chip wafer, and that “the
11 annealing of the TEOS layer seems to provide more uniform molecular bonding, increasing the total
12 charge conducted. *Id.* at 802-03. The examiner nonetheless finally rejected the pending claims on
13 November 15, 1994, specifically noting that “[t]he generalized allegations . . . that silicon dioxide
14 formation using TEOS results in an oxide having a low defect density and either compressive or
15 tensile stress are not substantiated by hard experimental evidence.” *Id.* at 811.

16 Xicor appealed the rejection to the Board of Patent Appeals and Interferences (“the Board”),
17 and in its briefing reiterated its arguments (1) that the structure of the claimed tunneling oxide layer
18 is significantly different from the prior art and (2) that the Peek reference taught away from the use
19 of TEOS oxide layer. *See id.* at 824-29; 866-69. On June 3, 1999, the Board reversed the
20 examiner’s rejection. It reasoned:

21 Inasmuch as all of the product limitations are disclosed by the applied prior art, the examiner
22 has established a *prima facie* case of unpatentability of the claims invention.

23 Notwithstanding the *prima facie* case of unpatentability, the appellant can come forward with
24 evidence establishing an unobvious difference between the claimed product produced by the
process recited *supra* and the prior art product produced by a conventional process. *In re*
Marosi, 710 F.2d 799, 803 (Fed Cir. 1983).

25 . . .

26 As indicated *supra*, the advantages of appellant’s claimed process step are set forth in the
27 [Owen] declarations as well as in the specification. Such advantages are sufficient to
establish unobvious differences between the claimed product and the prior art product . . .

1 *Id.* at 893-98. On November 12, 1999, claims 13 and 14 issued as claims 1 and 4 of U.S. Patent No.
2 5,997,585 (“the ‘585 patent”). *See* Evans Decl. Exh. D.

3 D. The ‘370 Reissue

4 On November 2, 2001, Xicor timely filed reissue application No. 10/053,140 for the ‘585
5 patent. *See* Evans Decl. Exh. A at INT0162220. New claims 12 and 13 of the reissue are identical
6 to claims 1 and 4 of the ‘585 patent, respectively, except that the new claims remove the
7 “unnecessary” TEOS limitation. *Id.* at 162221-22. Pointing to the ‘585 specification (which is
8 shared with the ‘774 patent), Xicor argued that TEOS “is only *preferably* used for the LPCVD
9 process.” *Id.* (emphasis in original). Xicor argued that “since [TEOS] is not necessary for forming a
10 silicon dioxide layer by [LPCVD] . . . the inclusion of [TEOS] represents an unnecessary limitation
11 in the claim. As a result, an unintentional error has resulted in that the claim is narrower than what
12 the patentee is entitled to.” *Id.* at 162221. On July 16, 2003, the examiner allowed the reissue
13 claims, explaining that “[t]he record for the patent indicates that the claims are not broader than the
14 subject matter that applicant previously surrendered during the prosecution of the patent nor do the
15 claims include the surrendered subject matter themselves . . . they are not barred by the recapture
16 rule . . .” *Id.* at 162338.

17 E. Present litigation

18 On April 9, 2010, SST filed the present action seeking a declaration that it is not infringing
19 the ‘370 patent and that the ‘370 patent is invalid. *See* Docket No. 1. On December 20, 2010, Xicor
20 asserted a counterclaim for patent infringement. *See* Docket No. 46. That same day, SST filed the
21 instant motion for summary judgment, *see* Docket No. 48, and Xicor filed its motion for partial
22 summary judgment on SST’s recapture defense, *see* Docket No. 47. The sole issue raised by the
23 parties’ cross-motions is whether claims 12 and 13 of the reissue patent ‘370 are invalid under the
24 rule against recapture.

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1 LEGAL STANDARD2 I. Summary Judgment

3 Summary judgment may be granted only when, drawing all inferences and resolving all
4 doubts in favor of the non-moving party, there are no genuine issues of material fact and the moving
5 party is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(c); *see generally Anderson v.*
6 *Liberty Lobby, Inc.*, 477 U.S. 242, 247-255 (1986). A material fact is “genuine” if the evidence is
7 such that a reasonable jury could return a verdict for the non-moving party. *Anderson*, 477 U.S. at
8 248. The moving party bears the burden of identifying those portions of the pleadings, discovery
9 and affidavits that demonstrate the absence of a genuine issue of material fact. *Celotex Corp. v.*
10 *Catrett*, 477 U.S. 317, 323 (1986). Once the moving party meets its initial burden, the non-moving
11 party must go beyond the pleadings and, by its own affidavits or discovery, set forth specific facts
12 showing that there is a genuine issue for trial. Fed. R. Civ. P. 56(e); *see Anderson*, 477 U.S. at 250.

13

14 DISCUSSION

15 The parties agree that there are no material facts in dispute and that the court may decide as a
16 matter of law whether claims 12 and 13 of the ‘370 patent violate the rule against recapture.

17 “Under the reissue statute, a patentee may surrender a patent and seek reissue enlarging the
18 scope of the original patent’s claims if through error without any deceptive intent he claimed less
19 than he had a right to claim in the original patent . . .” *MBO Labs. v. Becton, Dickinson & Co.*, 602
20 F.3d 1306, 1313 (Fed. Cir. 2010) (*MBO II*) (citing 35 U.S.C. § 251) (internal quotations and
21 alterations omitted). Although the reissue statute is to be construed liberally, the “rule against
22 recapture” places an important limit on the ability of a patentee to obtain a broadening reissue. *See*
23 *id.* “Under the rule against recapture, a patentee’s reissue claims are invalid when the patentee
24 broadens the scope of a claim in reissue to cover subject matter that he surrendered during the
25 prosecution of the original claims.” *Id.* (citing *Hester Indus., Inc. v. Stein, Inc.*, 142 F.3d 1472, 1480
26 (Fed. Cir. 1998)).

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1 The Federal Circuit has identified two justifications for the rule against recapture. Firstly, a
2 reissue patent is only available when the patentee erroneously failed to claim the full scope of the
3 invention and not where the narrower claims were the result of “deliberate amendments or
4 arguments designed to convince an examiner to allow the claims.” *Id.* (collecting cases). Secondly,
5 the rule against recapture is based on principles of equity. “An applicant’s surrender of subject
6 matter places competitors and the public on notice and may have caused them to rely on the
7 consequent limitations on claim scope.” *Id.* (internal quotation marks and alterations omitted); *see*
8 *also Kim v. ConAgra Foods, Inc.*, 465 F.3d 1312, 1323 (Fed. Cir. 2006) (“[T]he recapture rule is
9 aimed at ensuring that the public can rely on a patentee’s admission during prosecution of an
10 original patent.”). In the absence of the rule, “an unscrupulous attorney could feign error and redraft
11 claims in a reissue patent to cover a competing product, thereafter filing an infringement suit.” *MBO*
12 *II*, 602 F.3d at 1313 (citing *Hester Indus.*, 142 F.3d at 1484).

13 The Federal Circuit has developed a three-step test for the rule against recapture. The court
14 must determine:

- 15 (1) “whether and in what respect, the reissue claims are broader in scope than the
16 original patent claims”;
- 17 (2) “whether the broader aspects of the reissue claims relate to subject matter surrendered
18 in the original prosecution”; and
- 19 (3) “whether the reissue claims were materially narrowed in other respects, so that the
20 claims may not have been enlarged, and hence avoid the recapture rule.”

21 *N. Am. Container, Inc. v. Plastipak Packaging, Inc.*, 415 F.3d 1335, 1349 (Fed. Cir. 2005). For the
22 reasons set forth below, the undisputed facts clearly demonstrate that claims 12 and 13 of the ‘370
23 patent meet each requirement of the rule against recapture and are therefore invalid.³

24 I. Step 1: The Reissued Claims are Broader than the Original Claims

25 The parties do not dispute that the reissued claims 12 and 13 are broader than the original
26 claims 1 and 4, respectively. The two sets of claims are identical with the exception that the old
27 claims are limited to an LPCVD process “comprising the use of [TEOS].” “[A] reissue claim that

1 deletes a limitation or element from the patent claims is broader in that limitations' aspect." *In re*
2 *Clement*, 131 F.3d 1464, 1468 (Fed. Cir. 1997). By eliminating this limitation on reissue, the patent-
3 in-suit covers silicon dioxide tunneling layers formed by the LPCVD of chemicals other than TEOS.
4 Xicor identifies (1) silane along with oxygen and (2) dichlorosilane along with nitrous oxide as
5 examples of common TEOS alternatives. *See* Docket No. 47 at 14.

6 II. Step 2: Xicor Surrendered TEOS Alternatives in Prosecuting the '774 and '585 Patents

7 SST argues that Xicor surrendered TEOS-alternatives while prosecuting the '774 and '585
8 patents both through claim amendments and through arguments to the examiner and Board. "To
9 determine whether a patentee surrendered subject matter, [the court] asks 'whether an objective
10 observer viewing the prosecution history would conclude that the purpose of the patentee's
11 amendment or argument was to overcome prior art and secure the patent.'" *MBO II*, 602 F.3d at
12 1314 (quoting *Kim*, 465 F.3d at 1323). "If the patentee surrendered by argument, he must clearly
13 and unmistakably argue that his invention does not cover certain subject matter to overcome an
14 examiner's rejection based on prior art." *Id.* (collecting cases).

15 A. The Prosecution of the '774 Patent is Relevant

16 A critical threshold question is whether the prosecution of the '774 patent is relevant to the
17 recapture analysis here. The '370 patent is a reissue of the '585 patent, which began as a divisional
18 of the application that yielded the '774 patent. Xicor does not appear to dispute that it surrendered
19 TEOS alternatives in order to secure the '774 patent, and the record quite clearly shows (1) that
20 Xicor added the TEOS limitation to claim 7 in order to overcome an obviousness rejection over
21 Paterson and (2) that Xicor overcame a novelty rejection over Peek by arguing that the Peek taught
22 away from the use of TEOS in LPCVD. Instead, Xicor argues that it is improper here for the court
23 to consider the prosecution history of the parent application in determining whether subject matter
24 was surrendered as to its divisional.

25 The Federal Circuit recently has made clear that the entire patent family of a reissue patent
26 should be considered when addressing the rule against recapture. "[A] patentee may violate the rule
27 against recapture by claiming subject matter in a reissue patent that the patentee surrendered while
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1 prosecuting a related patent application.” *MBO II*, 602 F.3d at 1316. In *MBO II*, the Federal Circuit
2 acknowledged that some lower courts have held that a patentee only violates the rule against
3 recapture by surrendering subject matter in the prosecution of “the patent that is corrected by the
4 reissue patent.” *Id.* (quoting *U.S. Filter Corp. v. Ionics, Inc.*, 68 F. Supp. 2d 48, 72 (D. Mass.
5 1999)). After reviewing U.S. Supreme Court caselaw, Federal Circuit precedent and the legislative
6 history of the reissue statute, the court determined that this approach was erroneous. Of particular
7 relevance to the present case, the court expressly rejected the theory that “recapture does not
8 contemplate surrenders made while prosecuting the original application or any precedent, *divisional*,
9 continuation, or continuation-in-part applications.” *Id.* (emphasis added).

10 Xicor nonetheless argues that *MBO II* did not establish a *per se* rule that the entire patent
11 family is *always* relevant to the recapture analysis and that the circumstances here require limiting
12 the court’s inquiry solely to the prosecution of the ‘585 patent. Xicor points out that no court has
13 found the parent’s history to be relevant where, as here, the divisional was the result of a restriction
14 requirement, the claims of the divisional were not narrowed, the claims of the divisional never faced
15 a prior art rejection prior to restriction, and the claims of the divisional application were “patentably
16 distinct” from the claims prosecuted in the parent. *See* Docket No. 57 (Opp.) at 12.

17 There is no persuasive reason for excepting this case from the Federal Circuit’s clear
18 mandate that the entire patent family should be considered in the recapture analysis. Instead, a
19 review of the entire patent family history demonstrates that the ‘774 prosecution is highly relevant to
20 whether the ‘370 patent recaptured surrendered subject matter. Aside from the TEOS limitation, the
21 process limitations of claims 12 and 13 of the reissue patent are extremely similar to claims 6 and 1,
22 respectively, of the ‘774 patent, and during prosecution Xicor expressly linked its product claims to
23 the process claims that issued in the ‘774 patent. It initially pursued the product and process claims
24 together in the original ‘766 application, and it traversed the examiner’s conclusion that the process
25 and product-by-process claims were patentably distinct. When Xicor submitted the ‘203 divisional
26 application, it expressly stated that the new product-by-process claims were similar to the claims that
27 had been allowed in the ‘774 prosecution. Moreover, it was not until after the process claims had
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1 been allowed by the examiner and amended to include TEOS limitations that Xicor made any effort
2 to pursue its product-by-process claims. When it did so, its seven new claims all contained a TEOS
3 limitation, and Xicor soon amended the original claim to include the TEOS limitation. In presenting
4 this amendment to the examiner, Xicor attached the same declarations from William H. Owen it had
5 used to pursue its process claims, and it aped its earlier argument that Peek taught away from the
6 disclosed invention. Xicor repeated these arguments several times before the examiner and
7 eventually before the Board, which allowed the TEOS-limited product-by-process claims to issue.

8 The above chronology demonstrates that the TEOS limitations did not appear in the '585
9 patent due to a mere drafting error or a failure to appreciate the permissible scope of the disclosed
10 invention. *See MBO II*, 602 F.3d at 1315 ("MBO's failure to claim relative movement was not
11 'error without any deceptive intent.' MBO knew exactly how to claim relative movement.").
12 Instead, starting in May 1993 Xicor sought to patent EEPROM devices with tunneling layers formed
13 by processes it had been allowed to patent a few months earlier. The TEOS limitations appeared in
14 the allowed process claims, and it is unsurprising—and certainly not erroneous—that the TEOS
15 limitations appeared in subsequent product claims. Although Xicor pursued its product claims
16 through a "divisional" application, the prosecutions of the product and process claims did not occur
17 in parallel. Were that the case, it might be more persuasive that arguments made in one prosecution
18 are distinct from arguments made in the other. Instead, the prosecutions of the '774, '585 and '370
19 patents occurred in almost entirely linear succession, and the surrender of TEOS alternatives in the
20 earlier '774 prosecution cannot be insulated from the later broadening reissue. Were such surrender
21 beyond the scope of the recapture analysis, Xicor would be permitted to engage in what the Federal
22 Circuit has characterized as "immense fraud[] against the public":

23 If we limited our recapture review to the prosecution history for the patent corrected by
24 reissue, we would severely undercut the rule against recapture's public-reliance rationale: a
25 patentee could deliberately surrender subject matter during prosecution of an earlier patent,
obtain a continuation patent without mentioning the surrendered subject matter, and then
seek a reissue patent based on the continuation so as to recapture the subject matter.

26 *MBO II*, 602 F.3d at 1318. Similarly here, Xicor surrendered TEOS alternatives to obtain a process
27 patent and then pursued a divisional application for a product made by that process without

1 mentioning the surrendered subject matter to the new examiner. It then obtained a broadening
2 reissue of the product-by-process claims to recapture silicon dioxide layers formed by LPCVD of
3 TEOS alternatives. The principles of equity underlying the rule against recapture accordingly
4 require consideration of the entire patent family.

5 B. Process Claims vs. Product-by-Process Claims

6 Xicor makes several variations of the following argument: because a product-by-process
7 claim is not patentable on the grounds that it is made by a novel process, subject matter surrendered
8 as to a process limitation cannot be recaptured by a broadening reissue of the product-by-process
9 claim. It uses this logic to argue: (1) that the '774 prosecution history is irrelevant because process
10 and product-by-process are "patentably distinct," (2) that the examiner's restriction on this basis
11 distinguishes this case from *MBO II* and other decisions, and (3) that arguments related to TEOS in
12 the process limitations of the '585 patent did not surrender subject matter *in order to overcome prior*
13 *art.* Xicor is correct that a product-by-process claim may not overcome prior art merely by pointing
14 to its novel, non-obvious process limitation, but nonetheless subject matter surrendered with respect
15 to the process limitation at issue here falls squarely within the rule against recapture.

16 “A product-by-process claim is ‘one in which the product is defined at least in part in terms
17 of the method or process by which it is made.’ *Smithkline Beecham Corp. v. Apotex Corp.*, 439 F.3d
18 1312, 1315 (Fed. Cir. 2006) (quoting *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141,
19 158 (1989)). “The purpose of product-by-process claims is to allow inventors to claim ‘an otherwise
20 patentable product that resists definition by other than the process by which it is made.’” *Id.*
21 (quoting *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985)). “Thus an inventor will not be foreclosed
22 from the benefits of the patent system simply because a product is difficult to describe in words, or
23 its structure is insufficiently understood.” *Id.* Even though a product claim may be described with
24 reference to a particular process, “it is clear that such claims are always to a product, not a process.”
25 *Id.* at 1317. “It has long been the case that an old product is not patentable even if it is made by a
26 new process.” *Amgen Inc. v. F. Hoffman-La Roche Ltd.*, 580 F.3d 1340, 1366 (Fed. Cir. 2009)
27 (collecting cases). “As a result, a product-by-process claim can be anticipated by a prior art product

1 that does not adhere to the claim's process limitation." *Id.* at 1370. In other words, if a prior art
2 reference discloses each and every structural limitation of the claimed invention, it is no defense, in
3 and of itself, that the claimed invention is made by a novel process. *See id.* at 1366.

4 This is not to say, however, that the process limitation is irrelevant to the patentability of a
5 product-by-process claim. As the Board expressly acknowledged in finding the '585 claims
6 patentable, if the prior art appears to disclose all of the structural limitations of the claimed product,
7 an applicant may produce evidence that the product produced by the new process is different than a
8 product produced by conventional processes. *See* Evans Decl. Exh. G at INT0000893-94 (citing *In*
9 *re Marosi*, 710 F.2d 799, 803 (Fed. Cir. 1983)); *see also Amgen*, 580 F.3d at 1367 ("The question we
10 must next address is whether the production of EPO by recombinant technology resulted in a new
11 product, so that claim 1 was not anticipated by urinary EPO."). In *Amgen*, the Federal Circuit
12 agreed with the district court that the protein EPO formed by recombinant DNA technology was not
13 anticipated by EPO extracted from human urine. In doing so, the Federal Circuit pointed to studies
14 indicating that recombinant EPO had a higher molecular weight and different charge than urinary
15 EPO as well as to expert testimony that the two types of EPO had different carbohydrate
16 composition. *Amgen*, 580 F.3d at 1367. Similarly here, the prior art disclosed EEPROM devices
17 containing all of the structural elements disclosed in claims 1 and 4 of the '585 patent. Nonetheless,
18 Xicor was able to secure a patent for those claims by pointing to the structural advantages of
19 tunneling layers formed by the claimed process step. Such advantages included increased electrical
20 charge, fewer defects and a lower magnitude of induced stress. As the Board observed, "the
21 advantages of appellant's claimed process step are set forth in the declarations as well as in the
22 specification. Such advantages are sufficient to establish unobvious differences between the claimed
23 product and the prior art product." Evans Decl. Exh. G at INT0000895-96. Arguments and
24 amendments made with respect to the process limitation of a product-by-process claim therefore *can*
25 be used to overcome prior art rejections and accordingly can be relevant to the recapture analysis of
26 a reissued product-by-process claim. Moreover, given Xicor's repeated emphasis on the advantages
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1 of LPCVD of TEOS, such arguments and amendments in both the '774 and '585 prosecution are
2 relevant here.⁴

3 Arguments and amendments related to the process step of a product-by-process claim are
4 particularly significant in light of the public reliance rationale underlying the rule against recapture.
5 Although the inclusion of a process step is often inconsequential to the patentability of a product-by-
6 process claim, it is of great consequence in determining infringement of that claim:

7 In determining infringement of a product-by-process claim . . . the focus is on the process of
8 making the product as much as it is on the product itself. In other words, process terms in
9 product-by-process claims serve as limitations in determining infringement. As a result, a
product-by-process claim is not infringed by a product made by a process other than the one
recited in the claim.

10 The impact of these different analyses is significant. For product-by-process claims, that
11 which anticipates if earlier does not necessarily infringe if later. That is because a product in
12 the prior art made by a different process can anticipate a product-by-process claim, but an
accused product made by a different process cannot infringe a product-by-process claim.

13 *Amgen*, 580 F.3d at 1370 (internal citations and quotation marks omitted). The differences in the
14 validity and infringement analyses demonstrate that surrender and recapture of subject matter related
15 to a process limitation can greatly affect the scope of patent rights even if the surrendered subject
16 matter would be insufficient to overcome the prior art.⁵ If after issuance of a product-by-process
17 claim, a third-party manufacturer needed to determine whether a particular product infringed the
18 patent, it would be crucial to determine which precise processes are foreclosed by the patent in the
19 manufacture of that product. In order to do so, it would be entitled to look at the prosecution history
20 to identify subject matter surrendered as to a process limitation and rely on the patentee's
21 amendments and/or arguments to determine what processes it can employ to produce a non-
22 infringing product.⁶ If the patentee subsequently recaptured the surrendered subject matter via a
23 broadening reissue, the third-party manufacturer might suddenly find itself an infringer. "The
24 reissue statute cannot be construed in such a way that competitors, properly relying on prosecution
25 history, become patent infringers when they do so." *Kim*, 465 F.3d at 1323 (quoting *Mentor Corp. v.*
26 *Coloplast, Inc.*, 998 F.2d 992, 996 (Fed. Cir. 1993)).

1 The reissue claims here raise precisely these concerns. Before reissue, Xicor had a patent for
2 a process to form silicon dioxide tunneling layers using LPCVD of TEOS and a patent for EEPROM
3 devices with tunneling layers formed by LPCVD of TEOS only. An EEPROM manufacturer would
4 not infringe either patent by making the tunneling layer of the memory chip through LPCVD of an
5 alternative chemical to TEOS. Looking at the prosecution history of the '774 patent, it would be
6 clearly apprised that Xicor surrendered any TEOS alternative in order to secure its process patents,
7 and looking at the prosecution history of the '585 patent it would observe that Xicor incorporated
8 those same processes—and many of its earlier arguments—into its product-by-process claims. After
9 reissue, however, the EEPROM manufacturer employing LPCVD of a TEOS alternative would still
10 remain clear of the novel, non-obvious processes claimed in the '774 patent but it would potentially
11 infringe upon the product-by-process claims in the '370 patent. Absurdly, this would be the case
12 notwithstanding that the broadened process limitation triggering this infringement was undisputedly
13 surrendered in order to overcome prior art and secure the '774 process patents.

14 Xicor expressly acknowledges that process limitations are treated differently for purposes of
15 validity and infringement, but it argues that the court should “embrace” this incongruity for purposes
16 of the rule against recapture. Docket No. 57 (Xicor Opp.) at 8. Apparently this would involve first
17 acknowledging that a process claim and a product-by-process claim are “patentably distinct,” and
18 therefore validly subject to a restriction requirement. Because the two sets of claims are patentably
19 distinct, arguments and amendments made with respect to the process claim would then be walled
20 off from the product-by-process claim. Finally, the product-by-process claim could be broadened on
21 reissue to cover products that would not infringe the process claims. In other words, because the
22 process claim does not establish the patentability of the product-by-process claim, the product-by-
23 process claim may cover products made by processes that do not infringe the process claim. This
24 reasoning is untenable. The asymmetry regarding validity and infringement of a product-by-process
25 claim is typically to the disadvantage of the patentee; claimed products can be anticipated by
26 products made by a different process, but the claimed products are infringed only by those products
27 made by the same process. *See Amgen*, 580 F.3d at 1370. By contrast, Xicor’s approach would be
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1 to the detriment of the public. A patentee may be forced to limit a process claim in order to
2 overcome prior art, but it can nonetheless expand the practical scope of that process through a
3 broadening reissue of a related product-by-process claim. The recapture rule serves as a limit on the
4 availability of reissue patents in order to equitably protect the interest of the public, and a patentee
5 may not leverage the unique treatment of product-by-process claims to feign error and expand the
6 universe of potential infringers.

7 For the reasons explained above, under Step 2 of the recapture analysis, the court may
8 consider the arguments and amendments made with respect to the TEOS limitations in both the '774
9 and '585 prosecution histories. A reasonable, objective observer would conclude that the TEOS
10 limitation was included in order to distinguish the claimed processes and process limitations from
11 the prior art. By including the TEOS limitation, Xicor surrendered alternative chemicals to TEOS,
12 and these alternatives were recaptured by claims 12 and 13 of the '370 reissue patent.

13 III. Step 3: The Reissued Claims are Not Materially Narrowed

14 Under Step 3 of the recapture analysis, the court looks at whether the reissued claims were
15 materially narrowed in other respects to avoid the rule against recapture. *See Pannu v. Storz*
16 *Instruments, Inc.*, 258 F.3d 1366, 1371-72. SST argues that there is some conflict within Federal
17 Circuit caselaw regarding whether the proper focus of the third step is a comparison between the
18 reissued claims and the original patent claims *as issued* or between the reissued claims and the
19 original patent claims *before amendment*. *See* Docket No. 48 at 22-25. The court need not resolve
20 this dispute to conclude that the reissued claims were not materially narrowed with regard to the
21 surrendered TEOS alternatives.

22 The only difference between claim 12 of the reissue patent and the issued claim 1 of the '585
23 patent is the deletion of the TEOS limitation, meaning that the reissue claim is broader in all
24 respects. Claim 12 of the reissue patent is technically narrower than the originally filed version of
25 claim 1 in a number of respects, but none of these narrowing amendments is *material* to the subject
26 matter surrendered here, namely TEOS alternatives. *See* Docket No. 47 at 22 (side-by-side
27 comparison of claims). Both the originally-filed claim and the reissue claim are completely silent
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1 regarding the chemical used to form the recited silicon dioxide layer. *N. Am. Container*, 415 F.3d at
2 1350 (“[T]he recapture rule is applied on a limitation-by-limitation basis . . .”); *compare with*
3 *Varian Semiconductor Equip. Assocs., Inc. v. Axcelis Techs., Inc.*, No. 08-cv-10676-DPW, 2009 WL
4 189960, at *19 (D. Mass. Jan. 21, 2009) (where patentee surrendered a tilt axis “parallel” to the
5 plane, concluding that the patentee avoided the recapture rule by replacing a “perpendicular”
6 limitation with either “not parallel” or “substantially perpendicular” limitations). Furthermore, the
7 originally-filed claim referenced by Xicor is identical to claim 13 of the ‘766 application filed in
8 1988, before the examiner’s restriction and before Xicor fully prosecuted its process claims. After
9 the examiner’s first rejection of the ‘203 application, Xicor amended this claim to reflect the
10 language of the allowed process claims in the ‘774 patent. Once it did so, claim 1 became identical
11 to the reissue claim 12, with the exception of the TEOS limitation. Whether claim 1 of the ‘585
12 patent is considered in its final issued form, in its originally filed form, or in light of the entire patent
13 family prosecution, Xicor did not draft claim 12 of the reissue patent in a manner that materially
14 narrowed the recaptured subject matter.

15 Xicor does not appear to dispute that claim 13 of the reissue patent is not materially narrower
16 than claim 4 of the ‘585 patent. Claim 4 contained the TEOS limitation from the time it was filed,
17 and the only amendment made on reissue was to eliminate that limitation.

18 Claims 12 and 13 of the ‘370 patent meet all three requirements of the rule against recapture
19 and are therefore invalid.

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1 CONCLUSION

2 For the reasons stated above, SST's motion for summary judgment on its invalidity claim is
3 GRANTED, and Xicor's motion for partial summary judgment is DENIED. Claims 12 and 13 of the
4 '370 patent are hereby declared invalid for violating the rule against recapture.

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6 IT IS SO ORDERED.

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8 Dated: March 21, 2011

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MARILYN HALL PATEL
United States District Court Judge
Northern District of California

1 **ENDNOTES**

2 1. In the interest of simplicity, the patentee will be referred to herein as “Xicor,” although Xicor is
 2 technically the assignee of the patent.

3 2. The examiner also rejected dependent claim 8 on the grounds that the specification did not disclose
 4 that an annealing step was applicable to any type of tunneling layer besides one formed by LPCVD of
 4 TEOS. Evans Decl. Exh. E at INT0001164-66. The examiner explained that Xicor could overcome an
 5 enablement rejection by adding a TEOS limitation, which it later did. *Id.* The court need not address
 5 what, if any, significance this enablement rejection has for purposes of the rule against recapture.

6 3. The court’s conclusion is unaffected by the examiner’s determination that the reissue claims do not
 7 violate the rule against recapture. Although an examiner’s decision is generally due some deference,
 8 there is no indication that the examiner fully considered the prosecution histories of the entire patent
 8 family. *See N. Am. Container*, 415 F.3d at 1350 (rejecting argument that the district court failed to give
 9 proper deference where the examiner’s statement demonstrated “inattention to the rule against
 9 recapture”). The notice of allowance addresses the recapture rule in a single, short paragraph and in no
 10 way discusses why the arguments and amendments related to the TEOS limitation failed to sufficiently
 10 surrender subject matter that crept back into the reissue patent. Upon independently reviewing the
 11 record and the relevant law, the court respectfully disagrees with the examiner’s conclusion.

11 4. Xicor maintains that it “never argued that the unique structural properties of its invention were a
 12 result of the use of TEOS. Rather Xicor consistently argued that the novel structure of its invention
 13 resulted from the use of LPCVD to deposit a silicon dioxide layer combined with an annealing step.”
 13 Docket No. 57 (Xicor Opp.) at 20. This contention is inconsistent with the record. Xicor repeatedly
 14 argued that Peek taught away from the use of LPCVD of TEOS and argued to both the examiner and
 15 the board that LPCVD of TEOS yielded fewer structural defects and less stress than in the prior art
 16 devices. Xicor did point to the annealing step while arguing that the process limitation increased the
 17 total electrical charge that could be conducted across the tunneling layer, *see, e.g.*, Evans Decl. Exh. G
 17 at INT0000781, 819. This argument regarding the annealing step does not, however, affect Xicor’s
 18 surrender of TEOS alternatives. *See MBO II*, 602 F.3d at 1316 (“MBO’s arguments distinguishing the
 19 prior art based on its safety flange do not affect its surrender of another subject matter: a patentee’s
 20 arguments that emphasize one feature cannot cure arguments that clearly surrender another.”).

21 5. Although it need not decide the issue, the court acknowledges that at least one other district court
 21 has concluded that the recapture rule only applies to subject matter surrendered in order to overcome
 22 prior art and not to overcome other bases of rejection, such as lack of enablement. *See Voice Capture,*
 22 *inc. v. Intel Corp.*, 354 F. Supp. 2d 997 (S.D. Iowa 2004). Although *MBO II* does not expressly
 23 foreclose this conclusion, the broad public-reliance rationale embraced by the Federal Circuit, under
 23 which competitors may look to the prosecution history to determine the scope of patent rights, seems
 24 inconsistent with the *Voice Capture* court’s narrower formulation. Moreover, ignoring surrender with
 24 regards to the process limitation on the grounds that process and product-by-process claims are
 25 patentably distinct would permit the patentee to materially, and prejudicially, expand its patent rights
 25 solely due to the peculiarities of product-by-process claiming.

26 6. In this regard, as acknowledged by the Federal Circuit, “[t]he recapture rule serves the same policy
 26 as does the doctrine of prosecution history estoppel: both operate to prevent a patentee from encroaching
 27 back into territory that had previously been committed to the public.” *MBO II*, 602 F.3d at 1318
 27 (quoting *MBO I*, 474 F.3d at 1332) (alterations omitted).

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